

2019 Energy Report



GOVERNOR'S OFFICE OF
ENERGY DEVELOPMENT

Advancing Utah's Energy Future

Governor's Energy Advisor & Office of Energy Development

Dr. Laura Nelson | Governor's Energy Advisor

Rob Simmons, Esq., Deputy Director, OED

Annual Report to the Natural Resources, Agriculture & Environment Interim Committee



GOVERNOR'S OFFICE OF
ENERGY DEVELOPMENT

Advancing Utah's Energy Future

Advancing Utah's Energy Economy

The Governor's Office of Energy Development (OED) serves as the “primary resource for advancing energy and mineral development in the state” through a variety of means including incentives and other forms of industry assistance, implementation of the state's energy policy (63M-4-201) and the Governor's energy sector goals and objectives, and engagement in energy and mineral education and outreach to K-12 and the broader public, including workforce development and research initiatives. (63M-4-401)

- * Advancing energy policy solutions
- * Protecting affordable energy costs
- * Energy/minerals infrastructure & business development
 - Committed to economic prosperity for rural Utah



State Energy Policy 63M-4-301



- ❖ Utah shall have/promote adequate, reliable, affordable, sustainable and clean energy resources;
- ❖ Will promote all-of-the-above development;
- ❖ Will be conservative in use of incentives;
- ❖ Will promote infrastructure deployment, conservation, education

Unprecedented Pace of Change: Energy and Minerals Trends



- Changing resource mix for power generation
 - Increased wind, solar and storage
- Increased regionalization of power markets
 - EIM and EDAM in the West
- Increased domestic oil production
- Low natural gas prices domestically
- Increasing demand for natural gas globally
 - And advancing combustion technologies
- Sustained global demand for coal, with US demand declining
- Focus on innovation
 - Small modular nuclear reactors
 - Hydrogen
 - Energy storage
 - CCUS

Policy Considerations



- Independent energy office
 - Technical office with oversight of energy and minerals related programs
- Risk mitigation
 - Wildfires
 - Cyber security
 - Supply disruptions
- Promote infrastructure and Market Access
- Opportunities to advance energy innovation
 - Energy Storage
 - Hydrogen at scale
 - Advanced nuclear and combustion technologies (San Rafael Research Center)
 - CCUS

Diversity is key for robust energy and minerals ecosystems that support overall economic and environmental success

Strategic Planning for Energy Resource Diversity

To enhance energy affordability, resilience and the environment



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May 2018

2011 and 2014



Energy Initiatives
& Imperatives



Utah's 10-Year Strategic Energy Plan 2.0
Updated Plan - February, 2014



2014

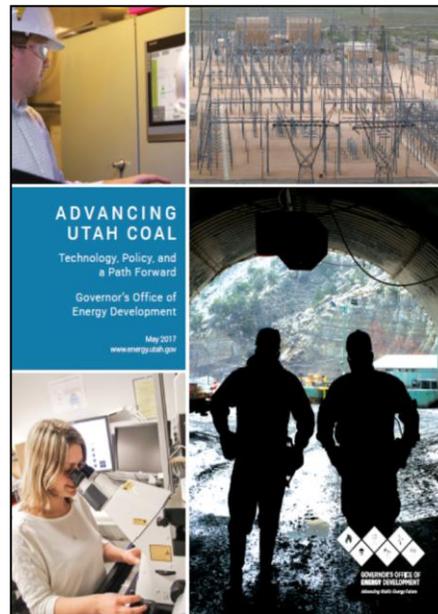


UTAH ENERGY EFFICIENCY
& CONSERVATION PLAN

Preparing for Utah's Energy Future



2016

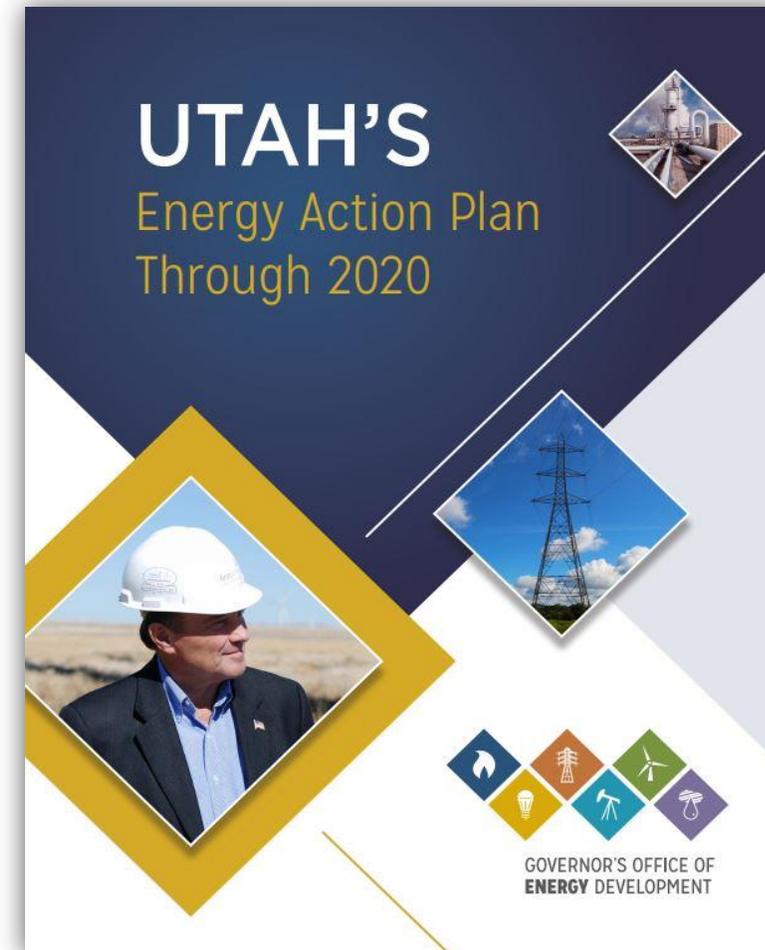


ADVANCING
UTAH COAL

Technology, Policy, and
a Path Forward

Governor's Office of
Energy Development

May 2017
www.energy.utah.gov



UTAH'S

Energy Action Plan
Through 2020



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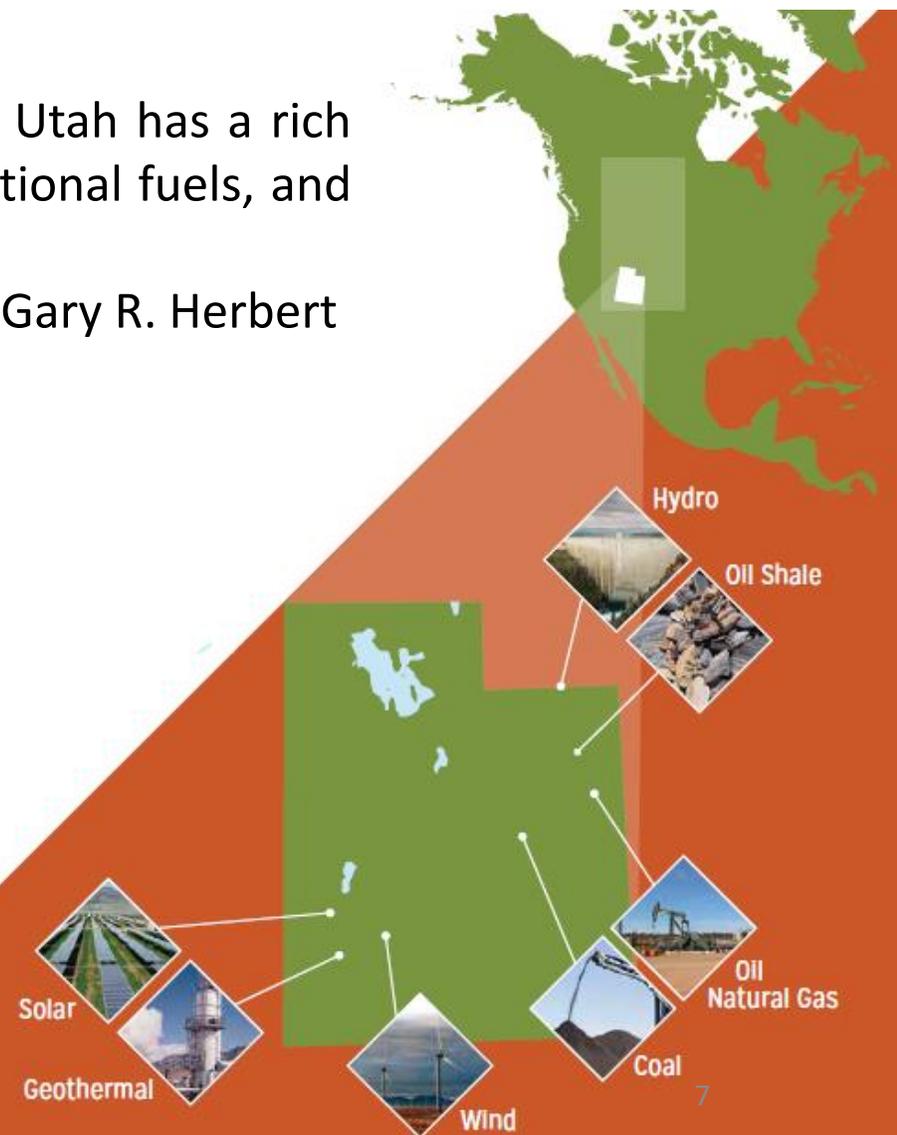
Abundant & Diverse Energy Resources

“We are uniquely positioned in the **Western Energy Corridor**. Utah has a rich abundance of diverse natural resources, both in terms of traditional fuels, and renewable and alternative energies.”

-Governor Gary R. Herbert

Economic Contribution

- \$20 Billion Industry
- Over 60,000 high paying jobs
- Affordable energy to support overall economy
 - Electricity: 10.50 cents/hour – 5th lowest nationally
- 18 % of energy produced exported
- Nearly 100% of non-fuel minerals produced exported



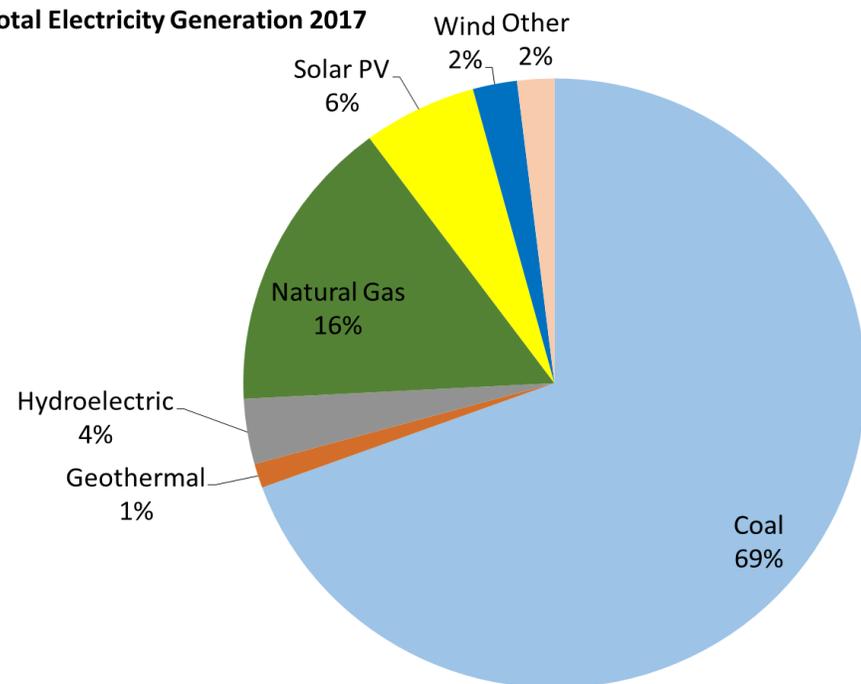


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Renewable Energy Growth

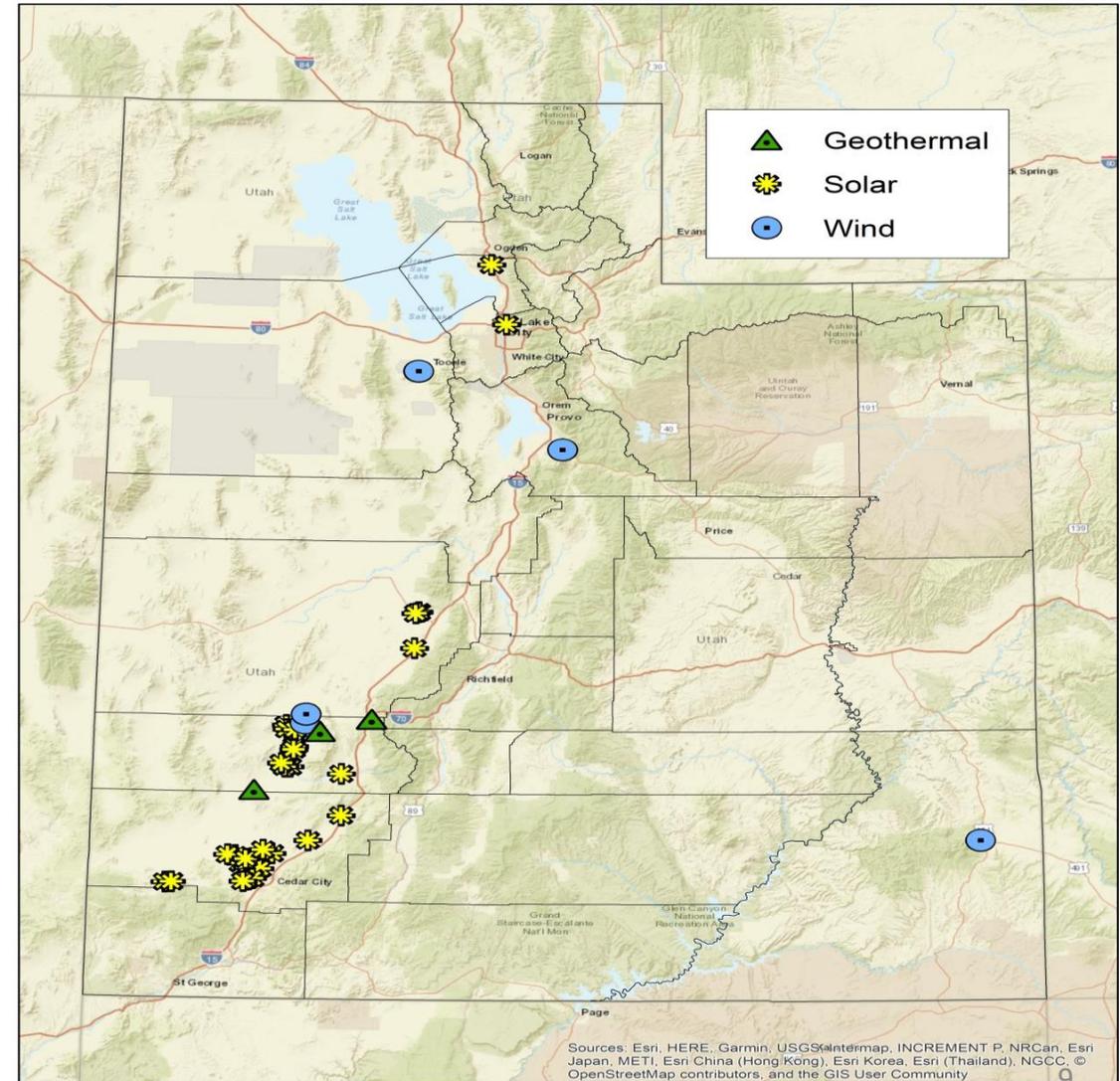


Utah Total Electricity Generation 2017



Promoting Rural Power Investment

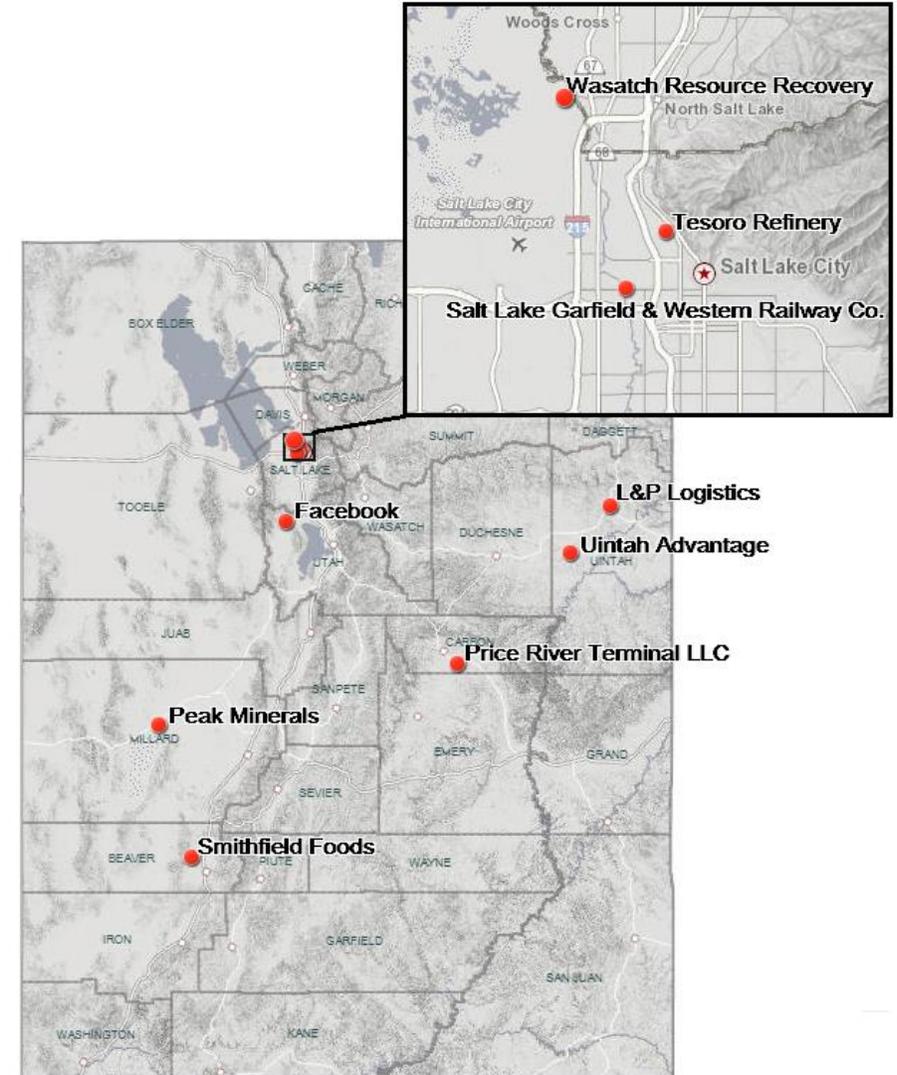
- OED administers Utah's Power Production Tax Credit
- Completed projects receiving tax credit represent an estimated:
 - 2 billion invested in rural renewable generation facilities
 - 850 new megawatts of new renewable power generation





Promoting Rural Infrastructure Investment

- OED administers Utah's High Cost Infrastructure Tax Credit (HCITC)
- HCITC is available for new:
 - Industrial
 - Mining
 - Manufacturing
 - Agricultural activity
- Approved projects represent an estimated:
 - \$.5 billion in new infrastructure
 - \$2.5 billion total investment



Utah Energy & Mineral Priorities



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Policy Solutions



Resilient Economy



New Market Access



Education



Innovation

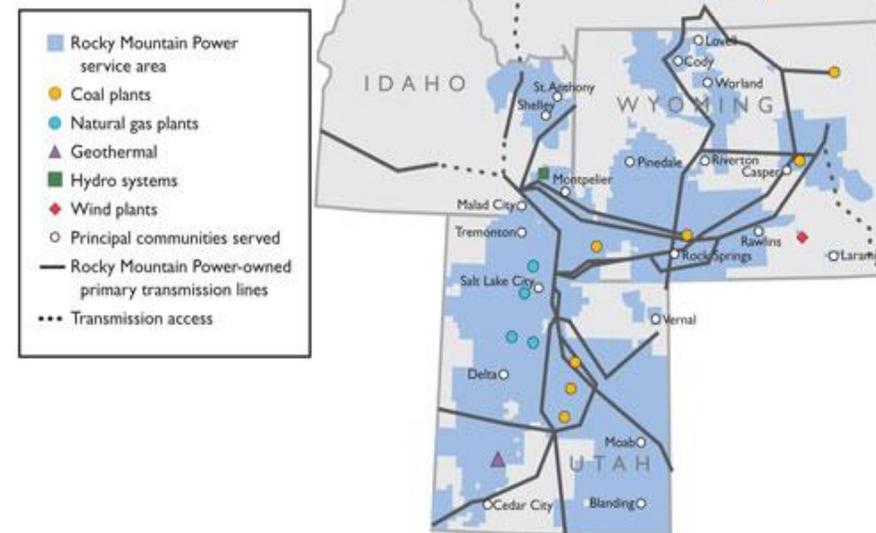




Policy Solutions

Utah's energy policy focuses on:

- Efficient markets;
- Resource Diversity;
- Technology;
- Infrastructure; and
- Partnerships



- **Ensuring that Utah's values of self determination and leveraging markets are maintained to keep energy costs low, while providing for reliable, safe, secure and clean energy solutions**
 - The US Department of Energy awarded OED funding for a two-year \$500,000 project to study electricity market options in the West with a focus on impacts to states



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Expanding New Market Access



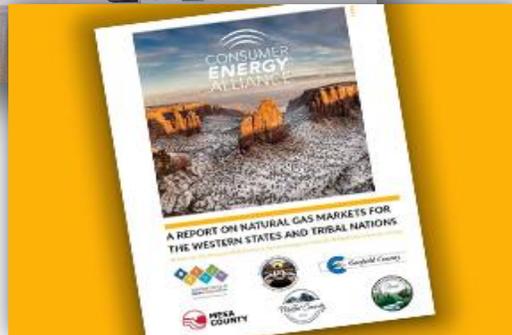
OED – Baja California Agreement

International collaboration to advance infrastructure, technology, global market access through Mexico



Western States & Tribal Nations

Regional collaboration to expand production, infrastructure, global market access



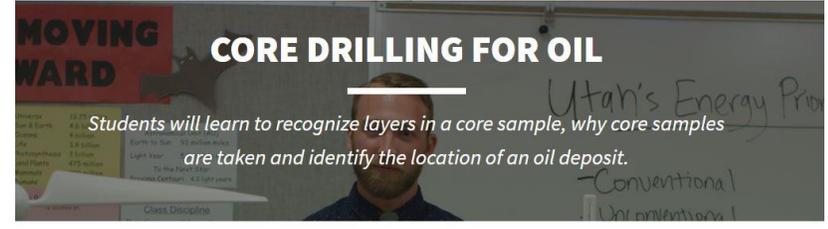
A Report on Natural Gas Markets for Western States and Tribal Nations



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Promoting Education & Workforce Development

- K-12 Lesson Plans
- Workforce Development Scholarships
- Education Events
 - Governor's Energy Summit
 - Energy Career Expo
 - Energy & Minerals Day at STEM Fest
- Education Videos
- Green Power Electric Car Competition



SUMMARY

Strand/Standard 5.1.1 Analyze and interpret data to describe patterns of Earth's feature earthquakes and volcanoes occur in bands that are often along the boundaries between while major mountain chains may be found inside continents or near their edges. Exam maps showing locations of mountains on continents and the ocean floor or the location earthquakes. (ESS2.B)

LESSON PERFORMANCE EXPECTATION

The student will be able to:

Students will recognize layers in the core samples, understand why core samples are taken and location of an oil deposit.

[DOWNLOAD HANDOUT](#) [DOWNLOAD LESSON](#)

Students will witness their classroom with all lights and electronic devices/equipment turned off. They will investigate the impact and then build a simple circuit with a battery and light.

Grades 4

Students will be able to explain the concept of combustion-burning of materials.

Grades 8

Students will compare geological and coal maps of Utah to determine why coal is unevenly distributed across the state.

Grades 8

Combustion Process

Students will investigate the products of a combustion reaction and test to identify gases.

Grades 10, 11, 12

Core Drilling for Oil

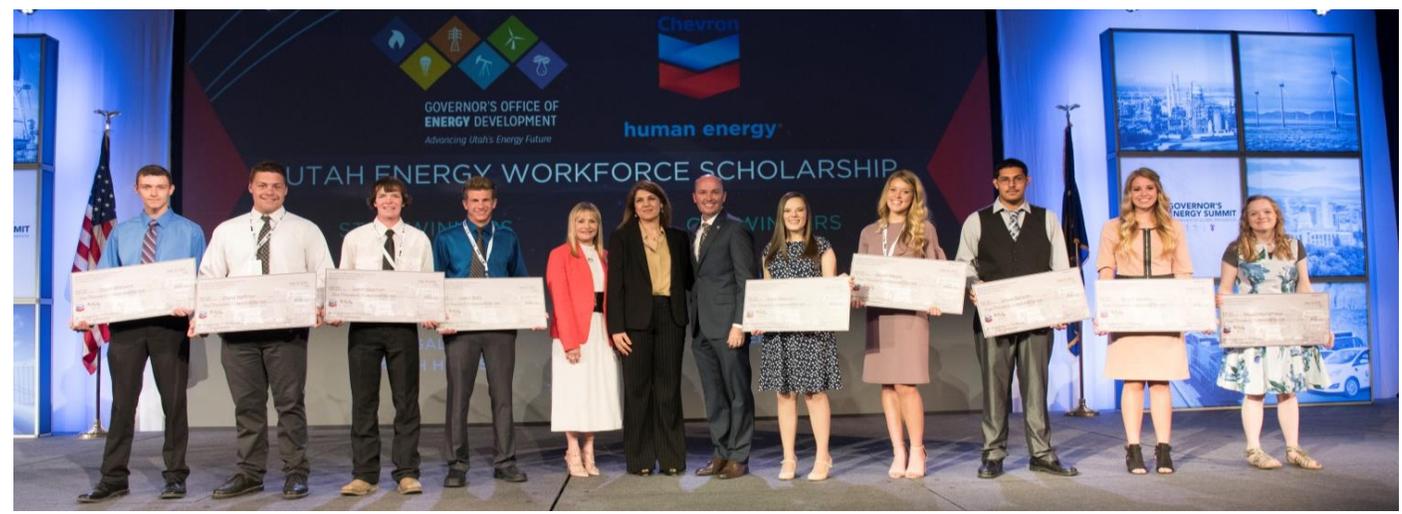
Students will learn to recognize layers in a core-sample, why core samples are taken and identify the location of an oil deposit.

Grades 5

Digging into Renewables

Students will learn local sources of energy in Utah and evaluate the environmental and economic cost of various forms of energy.

Grades 9





Research & Development

Carbon Capture & Utilization



\$10 million in funding realized to date from the U.S. Department of Energy for advanced coal technologies

San Rafael Research Center Emery, County

- L1500 Coal Combustion Lab Relocated from U of U
- Thorium Reactor to be built at Research Center
- 2.6M CIB award for critical infrastructure for the research Center approved

Hallyosite Clay



Coal to Carbon Fiber



Combustion and Gasification

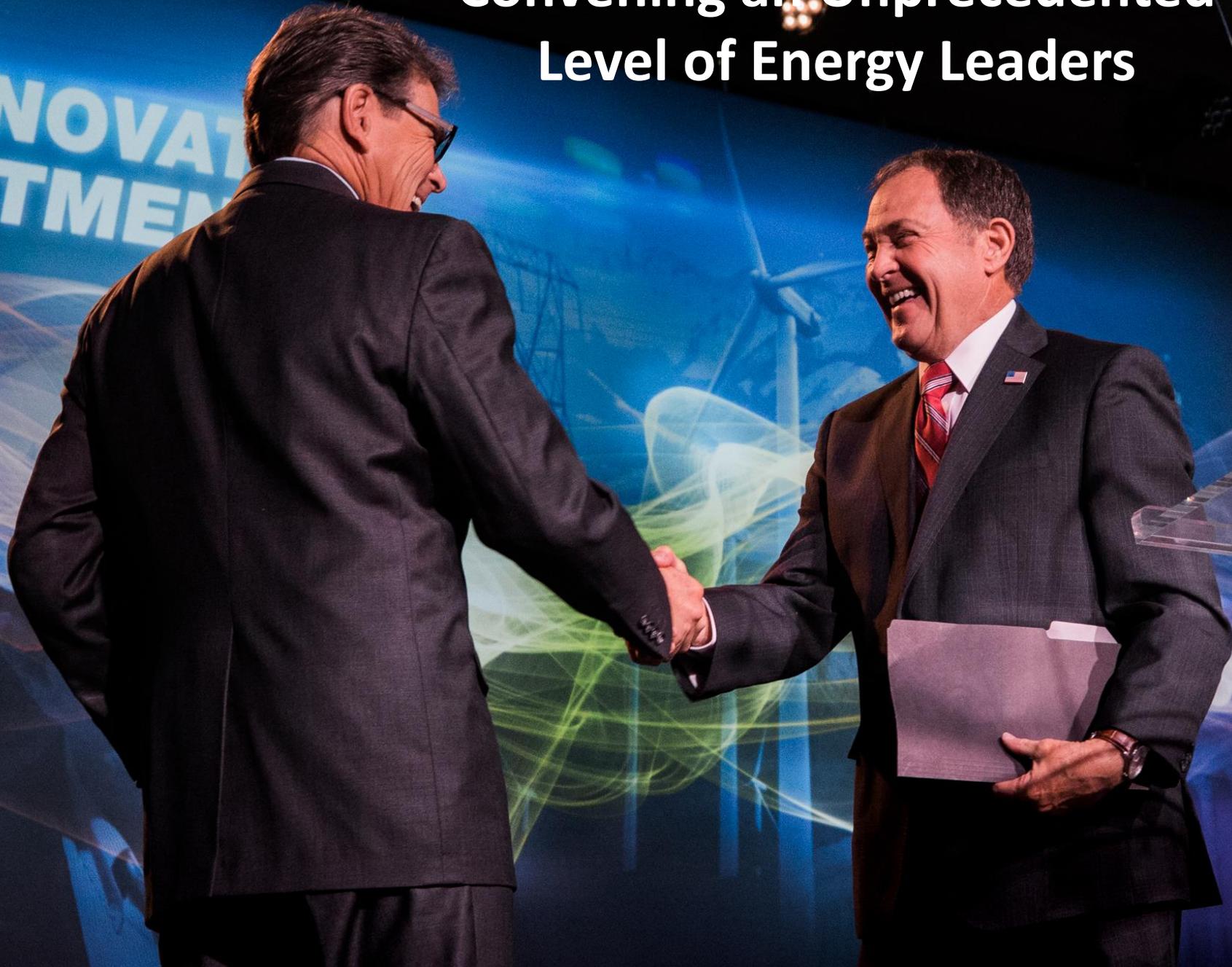


Convening an Unprecedented Level of Energy Leaders



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NOVAT
STMENT



Utah Advanced Clean Energy Storage Project



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POWERING INNOVATION
& INVESTMENT



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POWERING INNOVATION

Investors in Utah's Future



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Gary Hoogeveen
President and CEO
Rocky Mountain Power

“Rocky Mountain Power appreciates the willingness of Dr. Laura Nelson and the Governor’s Officer of Energy Development to be involved in issues that affect our business and help deliver good outcomes for our customers.

Her coordination on energy matters helps bring the right people together in the state and throughout the West.”





Craig Wagstaff
Senior Vice President
General Manager–Western Division
Dominion Energy

“Our partnership with the Governor’s Office of Energy Development has been important and worthwhile, especially when it comes to promoting energy codes training for Utah homebuilders.

Dominion Energy Utah and Rocky Mountain Power contribute funding, and the OED completes the training, resulting in energy-efficient structures that reduce consumption and help us meet the goals of wise energy stewardship in the Beehive State.”





Paul Browning President & Chief Executive Officer MHPS Americas

“The Governor's Office of Energy Development has paved the way for Utah to become a leader in the nation for energy policy, development, and for promoting technological innovation through a supportive regulatory environment.

We have had the privilege of working with OED across two years to advance our groundbreaking Advanced Clean Energy Storage project in Delta, which will put Utah on the map as a global leader in innovative energy solutions for generations to come. It's no surprise that other states are mirroring the framework and leadership of OED.”



Carlo Bonfante
Secretary of Economic Development
State of Baja California

"For two years we have been working with OED to broaden market access for Utah's energy resources.

Our complementary strengths continue to open the door for shared projects that drive investment for critical infrastructure and international partnerships to meet the world's energy demands while providing jobs and economic opportunities for our respective states."





David Bywater
Chief Executive Officer
Vivint Solar

“Vivint Solar appreciates OED's leadership and commitment to working with Utah's solar industry to be a viable partner in Utah's above all energy strategy.”

vivint.Solar[®]



Ryan Creamer
Chief Executive Officer
sPower

"With more than 150 renewable energy projects nationwide, sPower is proud to be headquartered in Utah and building our first utility-scale solar project in Juab County.

The Governor's Office of Energy Development does an excellent job promoting opportunities for energy resources of all types, including paving the way for Utah to experience 150% growth in renewable energy, while supporting affordability and grid resiliency.

It has been a pleasure to partner with them through the years, as we continue to grow our company locally and nationally."





James Grech
Chief Executive Officer
Wolverine Fuels, LLC

"The Governor's Office of Energy Development (OED) is dedicated to developing sound policy and a business-friendly environment for all responsible energy resources, and OED was instrumental in our decision to relocate our corporate headquarters to Utah in 2018.

We appreciate OED's commitment to working with the coal community on various local, federal and international matters to promote the premium (low-sulfur, high-BTU) coal produced in Utah that serves as an affordable, reliable and clean energy source for domestic and international economies."





Mitra Kashanchi
Refinery General Manager
Chevron Salt Lake Refinery

“Chevron is proud to partner with OED on the Utah Energy Workforce Scholarship Program because we recognize the importance of developing our future energy workforce.

To date, we’ve given more than \$65,000 to help students pursue STEM studies at Utah universities and technical colleges.”





Brad Shafer,
Government & Public Affairs Manager
Marathon Petroleum Company

“The Governor’s Office of Energy Development plays a critical role in Utah’s energy industry as both a clearing house for information and in incentivizing new energy related investments within the state.

Dr. Nelson and her team at OED have been very helpful as we worked to utilize the High Cost Infrastructure Tax Credit for our fuels standard compliance project at our refinery to produce lower sulfur tier 3 gasoline in Utah.”





Micheal Austin Chief Technology Officer Vutiliti

“Throughout my career across several U.S. states, I can confidently say that Dr. Nelson and her team at OED are unrivaled in their ability to actively work and partner with industry members to advance opportunities for both start-up and legacy businesses.

Their technical knowledge, access to investors and markets, and commitment to solutions has allowed companies like Vutiliti to succeed in building pathways for our innovative product to enhance energy efficiency among clients worldwide.”

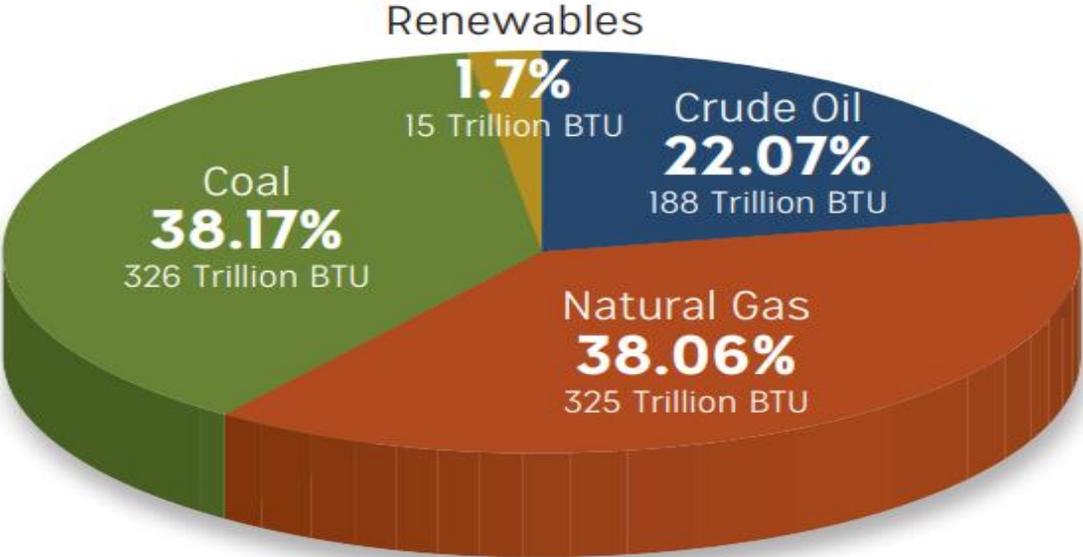


*Thank you &
Questions*



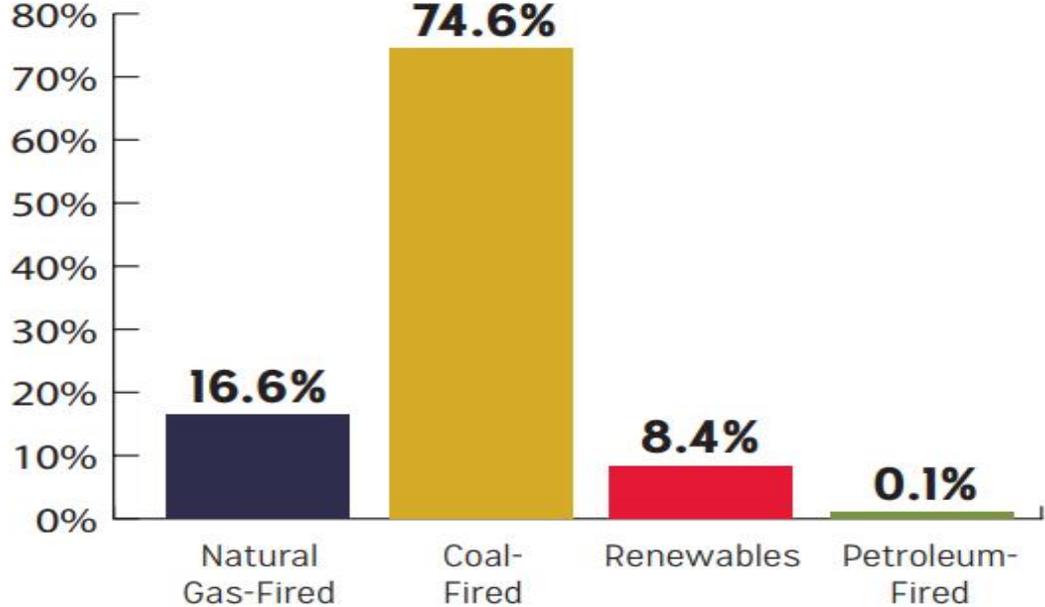
Utah's Energy Mix

2017 Utah Energy Mix



Created by the Kem C. Gardner Policy Institute

Utah Electric Generation Mix, 2017



Energy Information Administration

Innovations Fueling Our Future

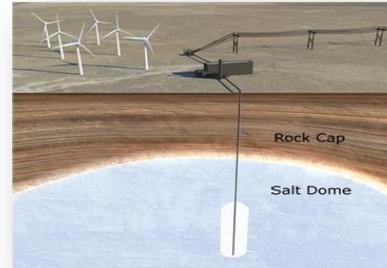


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Carbon Capture & Utilization



Energy Storage



Wireless Dynamic Charging



Industrial Combustion and Gasification



Anaerobic Digester



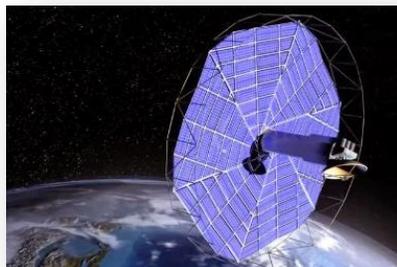
Net Zero Communities



Coal to Carbon Fiber



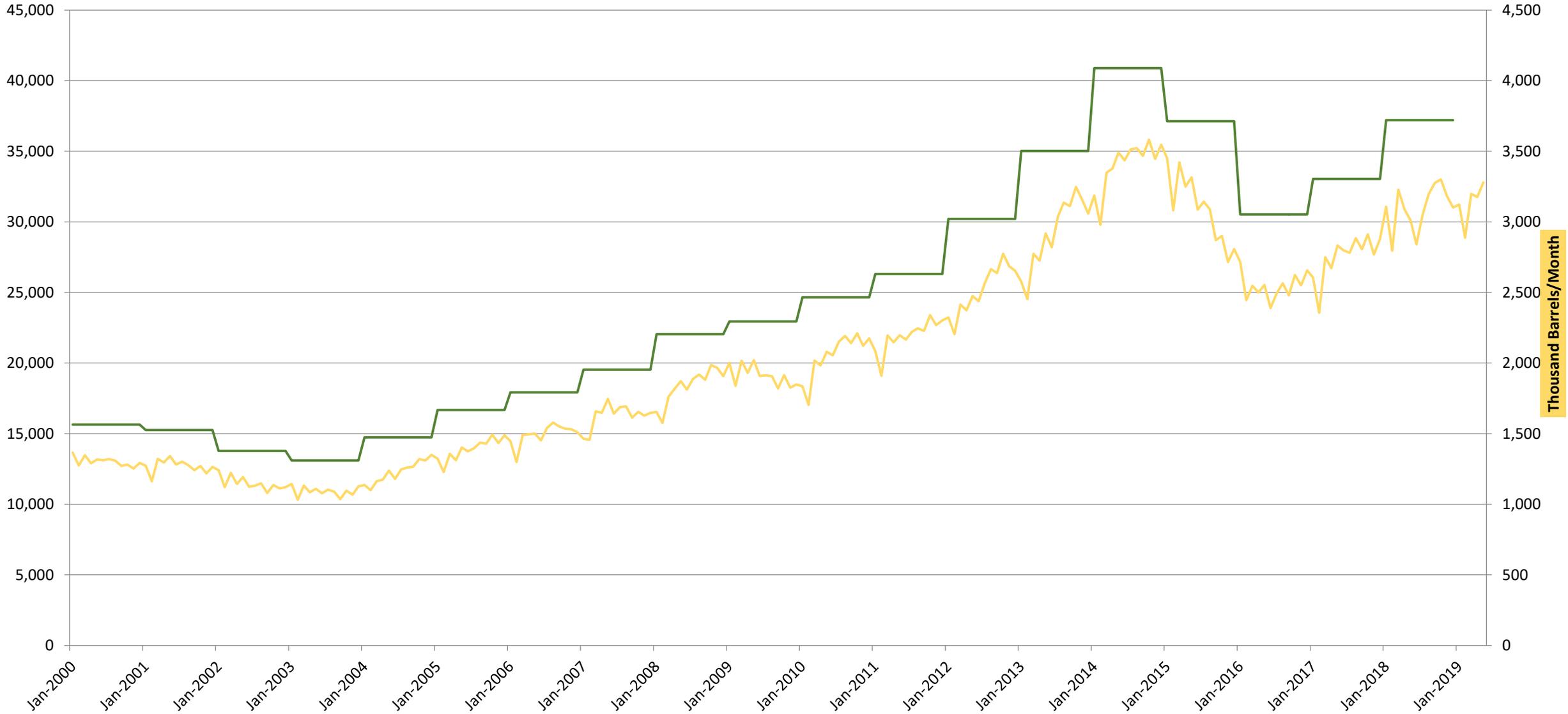
NASA Origami Solar Arrays



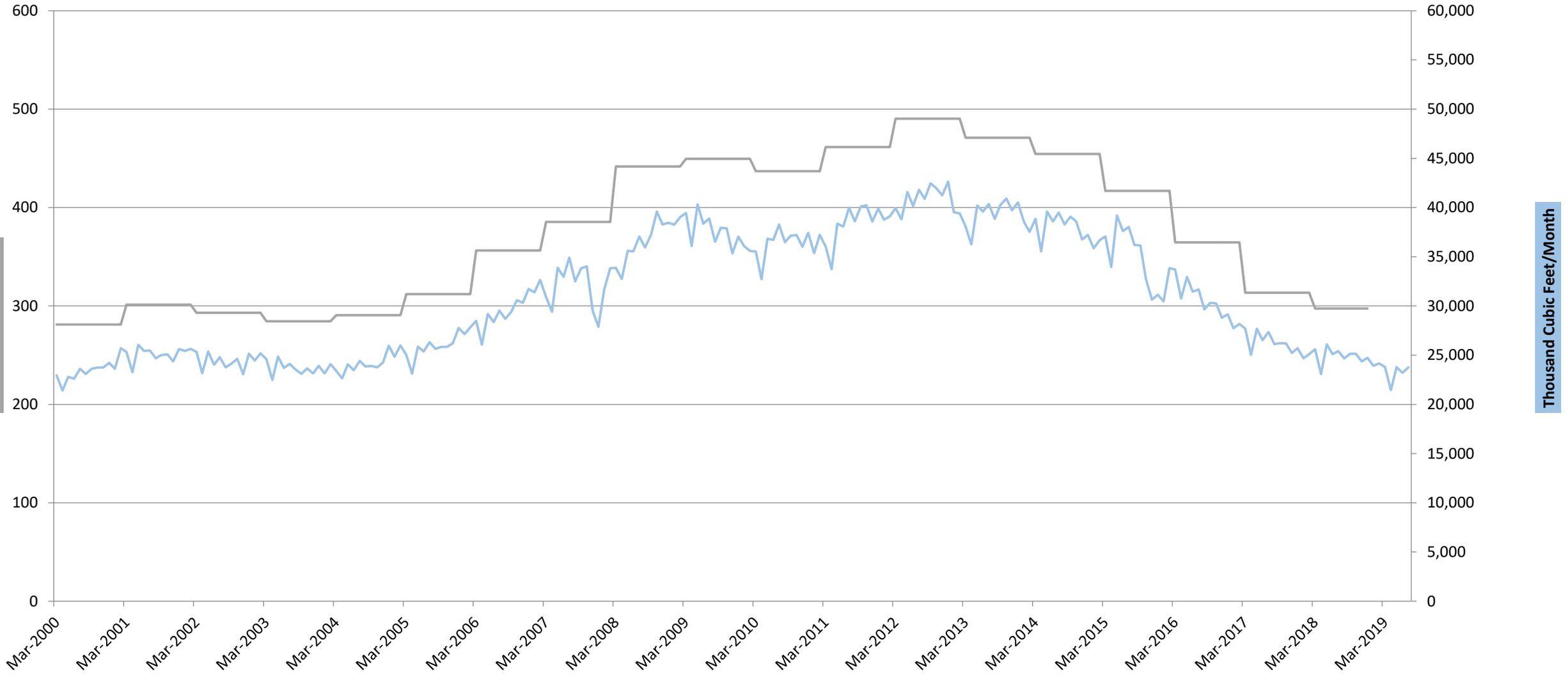
Battery Storage

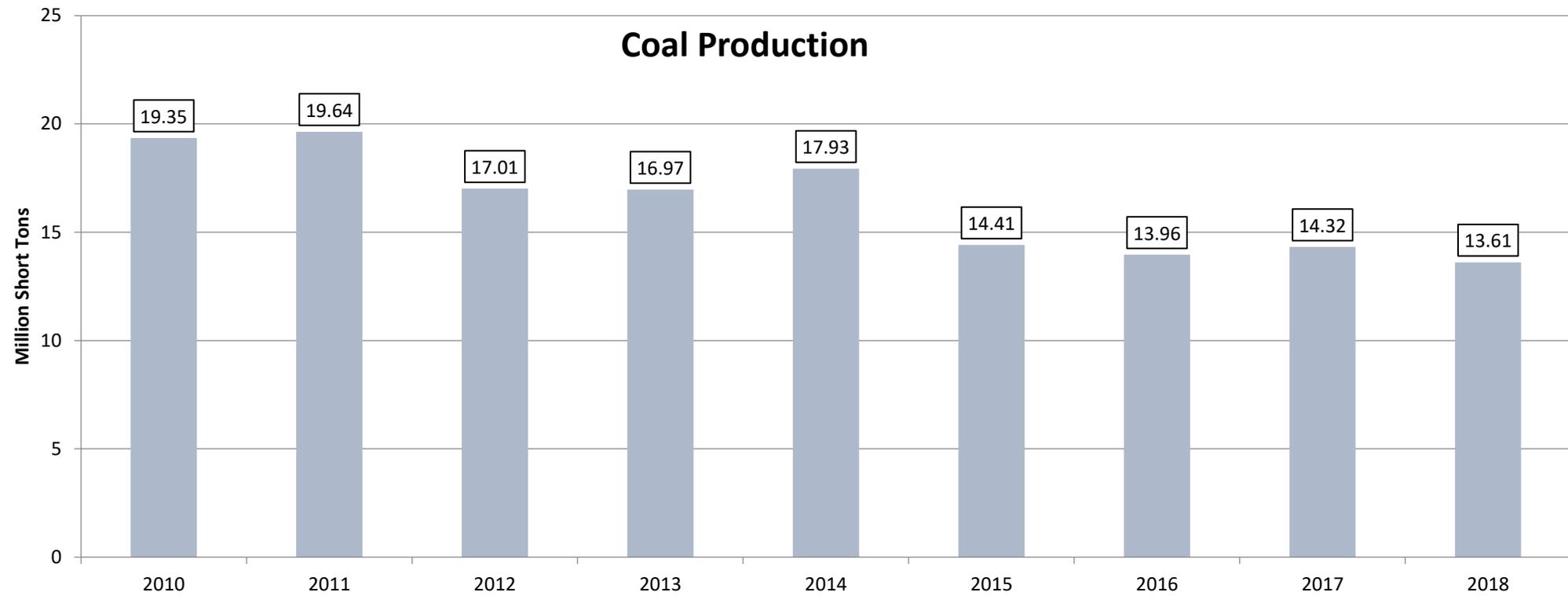


UTAH OIL PRODUCTION



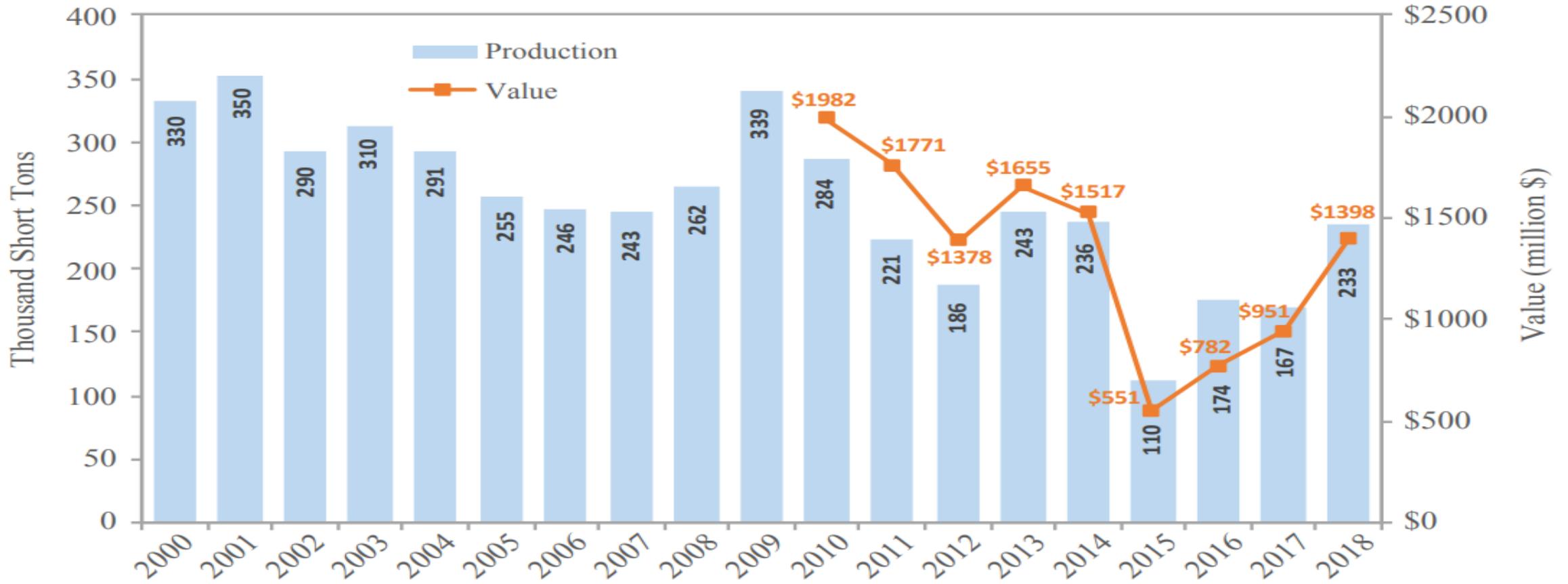
UTAH NATURAL GAS PRODUCTION





Source: EIA

Utah Copper Production



Source: UGS